

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Calculus: Review for Q3 Exam 3

This review sheet is not comprehensive. Be sure to study your old tests, notes, and homework as well!

1. A pile of sand in the shape of a cone whose radius is twice its height is growing at a rate of  $5 \text{ m}^3/\text{sec}$ . How fast is its height increasing when the diameter is 40 meters?

2. Evaluate:  $\int (-2x^{-3} + 20x^{-5}) dx$

3. Evaluate:  $\int \left( \frac{-14x^{5/2}}{2} \right) dx$

4. Evaluate:  $\int \left( \frac{-5\sqrt[3]{x^2}}{3} \right) dx$

5. Evaluate:  $\int_{-1}^3 (-x^3 + 3x^2 + 1) dx$

6. Evaluate:  $\int_{-3}^0 (4\sqrt[3]{x}) dx$

7. Given  $\frac{dy}{dx} = \frac{6x^2 - 2x^3}{x}$  and  $y(1) = 4$  find  $y$ .

8. If  $f'(x) = 3x^2 - 8x + 1$  and  $f(1) = 4$ , find  $f(x)$ .

9. If  $f''(x) = 6x^2 - 12x + 2$ ,  $f'(1) = -3$ , and  $f(-2) = 1$ , find  $f(x)$ .

10. Consider a conical tank whose radius at the top is 4 feet and whose depth is 10 feet. The tank is being filled with water at a rate of  $2 \text{ ft}^3/\text{min}$ . How fast is the water level rising when the depth of the water is 5 feet?

